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10.4103/jfcm.JFCM_80_16

Prevalence and spectrum of functional disability of urban elderly subjects: A community-based study from Central India

Priya Keshari, Hari Shankar

Abstract:

INTRODUCTION: One of the major determinants of the quality of life of elderly subjects is their functional status, which refers to their ability to perform normal daily activities. This study was carried out to determine the prevalence of functional disability in terms of restriction in the activities of daily livings (ADLs) in elderly subjects.

MATERIALS AND METHODS: This community-based cross-sectional study was conducted in an urban area of Varanasi, India, with 616 elderly subjects (60 years and above) selected for the study by an appropriate sampling procedure. A predesigned and pretested questionnaire was used to elicit the desired information after taking consent from the study subjects. Statistical Package for Social Sciences (SPSS 21st version) was used for analysis; Chi-square test and z-test were used to test for statistical significance.

RESULTS: Prevalence of functional disability in elderly subjects was 53.6% (95% confidence interval: 49.67–57.5%). Restriction of any ADL with maximum severity was observed in 13.5% of the subjects. Independence in ADLs was maximum (100%) for bowel continence and lowest for climbing stairs (47.4%). On the basis of Barthel Index score, 25.2% and 4.4% of the subjects had moderate and severe dependency, respectively. In comparison to mobility restriction, the proportion of subjects whose ADLs were not affected was significantly ($P < 0.01$) more in the self-care domain.

CONCLUSION: Nearly half of the elderly subjects were functionally disabled on the basis of ADL performance. The number of persons of this age group in the domain of restricted mobility is quite high. It is necessary and also possible to design and implement programs that will involve all persons concerned with their care to improve the functional status of the geriatric population.

Keywords:

Activities of daily living, activities of daily living score, functional disability, geriatric, health status

Introduction

Aging is an inevitable process which brings with it many chronic diseases and disabilities as a result of gradual degeneration. Because of various public health policies, implementation of programs, and socioeconomic development, aging of the population has emerged as one of the most significant trends of the present century.^[1] Although it is considered a

significant achievement, the challenges posed by the increasing aging population are enormous. The elderly, in general, and very old people, in particular, have reduced ability to live independently. The majority require long-term care and support because of their limited mobility and physical and mental health problems.^[2,3] This becomes even more important in the changing sociocultural milieu where reverence for old age has diminished, individualism in

Department of Community
Medicine, Institute
of Medical Sciences,
Banaras Hindu University,
Varanasi,
Uttar Pradesh, India

Address for correspondence:

Miss. Priya Keshari,
Research Scholar,
Department of Community
Medicine, Institute
of Medical Sciences,
Banaras Hindu University,
Varanasi - 221 005,
Uttar Pradesh, India.
E-mail: priya.bhu2010@
gmail.com

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How to cite this article: Keshari P, Shankar H. Prevalence and spectrum of functional disability of urban elderly subjects: A community-based study from Central India. J Fam Community Med 2017;24:86-90.

families is on the increase, and the rising trend of nuclear families has compromised the support system that used to exist for the elderly.^[4]

The number and proportion of the world's elderly population in 2000 were 605 million and 11%, respectively, and it is estimated that the corresponding figures in 2050 will be 2 billion and 20%.^[5] In India, there are at present around 90 million elderly persons.^[6] There were 20 million people aged 60 years and above in 1951 in the country under reference.^[7] This number rose to 71 million in 2001 and is expected to rise to 315 million (i.e., 20% of the total population) by 2051.^[8] The proportion of those aged 60 years and above is steadily rising; this was 7.4% and 8.6% in 2001 and 2011, respectively.^[9] Because of the huge population of India, the absolute number of individuals who require multidimensional support is significant. As there is multiplicity of morbidities and functional disabilities in old age, geriatric care places a considerable burden on the health system and family members. One of the major determinants of the quality of life of elderly subjects is their functional status. This is the individual's ability to live independently and relate to his/her environment or perform normal daily activities for basic needs and carry out normal functions to maintain health and well-being.^[10] One of the approaches to study the well-being of the elderly is to study their competence in activities of daily living (ADLs) or a self-care activity that an individual has to perform daily, which is a composite index of the individual's ability to perform some basic functions.^[7]

Considering the fact that limitations to ADLs are unavoidable in the elderly, an assessment of their functional status becomes a fundamental aspect of care. This assessment has significant policy implications and predicts the need for assistance for this age group. Further inputs provided as a result of the assessments will help in the design and implementation of interventions to assist the aged live safely and independently.^[11] Although there are some studies on the functional status of the elderly in urban settings,^[10,12,13] a comprehensive study on the overall life and the prevalence of functional disabilities based on ADL performance has been not undertaken in eastern Uttar Pradesh, where geriatric care is largely absent and health conditions of the elderly are far from satisfactory. With this background, the present study was conducted among urban elderly subjects (60 years and above) with the primary objective of finding the prevalence of restrictions on their overall life and ADLs.

Materials and Methods

This community-based cross-sectional study was conducted in Varanasi city, an oldest city in the world known for its cultural heritage. The population of

urban Varanasi is 1,597,051, which is 43.44% of the total population of the district. Urban subjects aged 60 years and above were considered as the study subjects. Considering the prevalence of functional disability in subjects 60 years and above as 40%^[14] and permissible error (absolute) as 5%, the estimated sample size was 369. After taking a design effect of 1.5, this became 554, and with a nonresponse rate allowance of 10%, the final sample size was 616.

The following steps were taken in selecting the subjects of the study: (a) Nine out of ninety census enumeration wards in Varanasi city were selected by simple random sampling; (b) households in the selected census enumeration wards were selected according to probability proportion to size adopting systematic random sampling method; (c) one family in the chosen households was selected randomly using the lottery method; and (d) one study subjects in the chosen family was selected randomly using the lottery method. If there was no elderly person in the selected family, one was chosen from the adjoining family using the same procedure. All those who consented to take part in the study and whose duration of stay in the study area was >6 months were included in the study. Subjects with a terminal illness or serious mental issues were excluded. The study was approved by the Ethical Committee, Institute of Medical Sciences, Banaras Hindu University, and consent was obtained from the participants of the study and the necessary support and counseling were given.

Data was collected by using a predesigned and pretested questionnaire. To measure the ADLs of elderly subjects, Barthel's Index of ADL (BAL) was used.^[15] As this tool was used in a community setting, area-specific modifications in responses were made after pretesting. Personal characteristics of the study participants were obtained by interviewers using a predesigned and pretested questionnaire. Their ADL status was measured according to the questions pertaining to ADL. Barthel's Index questions were used to measure functional disability by quantifying the subjects's performance in ten activities of daily life. These activities are grouped according to self-care (viz., feeding, grooming, bathing, dressing, bowel and bladder care, and toilet use) and mobility restriction (mobility, transfer, and stair climbing). Scoring of Barthel's Index was computed based on the criteria suggested by Shah *et al.*,^[16] and the subjects were classified into five categories (viz., total dependency, severe dependency, moderate dependency, slight dependency, and no dependency).^[16] Data thus obtained were entered into a personal computer and analyzed using SPSS software (SPSS version 21.0, IBM Corp., Armonk, NY.); Chi-square test and z-test were used to test for statistical significance.

Results

Functional disability in subjects was determined in this study using BAL, and the pattern of ADL of the study subjects is shown in Table 1. The subjects performed the majority of self-care activities independently.

Transfer from bed to chair or another place without assistance is an important activity of daily life; 24% needed either verbal assistance or one person to help with transfer or needed only supervision or help. With regard to transfer, major help refers to assistance provided by two people or one strong/trained person though subjects

Table 1: Pattern of activities of daily living (ADL) of the elderly subjects (n=616)

ADL	N (%)
Bowels	
Incontinent	0
Occasional accident (1/week)	0
Continent	616 (100)
Bladder	
Incontinent	0
Occasional accident	24 (3.9)
Continent	592 (96.1)
Grooming	
Needs help	41 (6.7)
Independent, face, hair, teeth, shaving	575 (93.3)
Toilet use	
Dependent	0
Needs some help but can do something	29 (4.7)
Independent	587 (95.3)
Feeding	
Unable	0
Needs help for serving of food, etc.	44 (7.1)
Independent	572 (92.9)
Transfer	
Unable	0
Major help (1-2 people, physical)	26 (4.2)
Minor help (verbal or physical)	148 (24.0)
Independent	442 (71.8)
Mobility	
Immobile	0
Wheelchair independent including corners, etc.	0
Walks with the help of one person (verbal or physical)	119 (19.3)
Independent (but may use any aid, e.g., stick)	497 (80.7)
Dressing	
Dependent	3 (0.5)
Needs help but can do part unaided	50 (8.1)
Independent	563 (91.4)
Stairs	
Unable	73 (11.9)
Needs help (verbal, physical, carrying aid)	251 (40.7)
Independent up and down	292 (47.4)
Bathing	
Dependent	25 (4.1)
Independent	591 (95.9)

can sit unaided. A subject who was able to move around house either without any assistance or by using an aid (e.g., stick) was considered independent as regards to mobility. Nearly 80.7% of the subjects had independent mobility. For moving up and down stairs, 40.7% of the subjects needed help (viz., verbal, physical, and an aid). Inability to go up and down stairs was observed in 11.9% of the subjects [Table 1].

The overall prevalence of functional disability in subjects by gender is shown in Table 2. Out of the 616 subjects, 330 had ADL involvement; thus the prevalence of functional disability was 53.6% (95% confidence interval: 49.67%–57.5%). Restriction of some ADLs with maximum severity was observed in 13.5% of the cases; corresponding values for male and female subjects were 13.3% and 13.7%, respectively. Assisted ADL performance was 39% in male and 40.9% in female subjects and this was statistically not significant ($p > 0.05$) [Table 2]. The activities of daily living were grouped according to self-care and mobility and the results are shown in Figure 1. Self-care domain included seven ADLs (viz., feeding, grooming, bathing, dressing, bowel and bladder care, and toilet use). In this domain, no ADL was affected in 84.58% of the elderly subjects whereas 7.79% elderly subjects required assistance in the performance of ADLs. Restriction in mobility was assessed on the basis of performance of three ADLs (viz., mobility, transfer, and moving up and down stair). About 47% elderly subjects had no ADL issues and 41.23% required some assistance with ADLs. In comparison to mobility restriction, the proportion of subjects with unaffected ADL was significantly more in the self-care domain ($Z = 37.66; p < 0.01$). A reverse pattern prevailed for assisted performance of ADL ($Z = 14.8; p < 0.01$) as well as for interference of any ADL with maximum severity ($Z = 19.84; < 0.01$). On the basis of Barthel's Index score, 25.2% of the subjects had moderate dependency and 4.4% had severe dependency, whereas 46.4% of the subjects had no dependency [Table 3].

Discussion

Aging is associated with a higher risk of functional dependence as well as high prevalence of functional disability or limited functional ability. The threat to

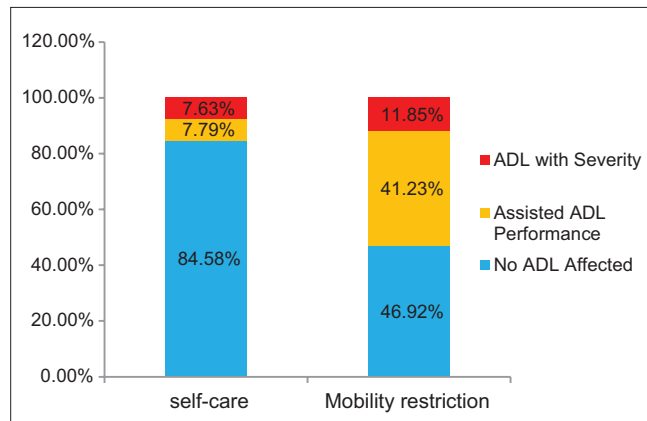
Table 2: Prevalence of functional disability in the elderly subjects by gender

Particulars	Male N (%)	Female N (%)	Total N (%)
No ADL affected	133 (47.7)	153 (45.4)	286 (46.4)
Assisted ADL performance	109 (39.0)	138 (40.9)	247 (40.1)
Restriction of any ADL with maximum severity	37 (13.3)	46 (13.7)	83 (13.5)
Total	279 (100)	337 (100)	616 (100)

$\chi^2=0.32$; $df=2$; $P>0.05$ (0.852). ADL = Activities of daily living

Table 3: Distribution of the study subjects according to their overall activities of daily living status (n=616)

Status	Score	N (%)
Total dependency	0-20	0
Severe dependency	21-60	27 (4.4)
Moderate dependency	61-90	155 (25.2)
Slight dependency	91-95	148 (24.0)
No dependency	100	286 (46.4)

**Figure 1:** Distribution of the activities of daily living of elderly subjects according to their self-care and mobility restriction

functional independence in the elderly arises as a result of physiological changes resulting from the aging process. Functional limitation lowers the older person's quality of life and predisposes him/her to hospital admissions and the demands of more support from family members.^[11] There are various ways of assessing disability, but the widely used methods are the London Handicap Scale, Medical Outcome Study 36-Item Short Form Health Survey, Nottingham Health Profile, Functional Independence Measure, and BAL. In this study, Barthel's scale was used to assess functional status. Assessing the functional status of an individual helps to determine the kind of assistance that individual requires.^[17]

BAL was widely applied initially in hospitals and institutions where bowel and bladder incontinence were quite significant. In this study, all subjects had no bowel incontinence and less than one in twenty had the occasional bladder incontinence. This is understandable as the study was community based. However, this cannot be generalized as in a study conducted in North India one in five had no control over urination and defecation.^[10] Inability to groom oneself has serious psychological impact on the individual, and any assistance required can have serious repercussions on physical and mental health. Nearly one in seven subjects needed help for this activity. With regard to toilet use, dependency was considerably more in a study conducted in Lucknow in North India^[10] (one out of ten) and Chandigarh

in northwest India^[7] (one in six) than the present study (one in twenty). Assistance for feeding by elderly subjects was less than one in ten. This is in accordance with the findings of several other studies.^[7,10,18] Contrary to this, in North India, nearly one out of five elderly subjects depend on others for their feeding.^[12]

Restriction of mobility imposes several constraints on the elderly. Complete immobility or dependency on the wheelchair diminishes the physical capability of an individual. However, none of the subjects in this study belonged to these categories. Since one in five subjects required the assistance of one person to walk, much effort must be put into the endeavor to change the trend of individualism in the society. Nearly one out of ten subjects of this study needed help to put on their clothes, but a study conducted in an urban community of Lucknow, North India,^[12] found more people in this category of dependency.^[10] Similar findings were reported by a study in urban Dehradun from northwestern region of India.^[18] It is quite disturbing to note that more than half of the subjects were not able to go up and down stairs unaided. One out of ten subjects were completely incapable of performing this activity and the rest needed encouragement, physical help, or the aid of a stick. Most people who live in urban areas except those whose homes are on one floor need to go up and down stairs. Restricted joint movement imposes high dependency and requires the concerted effort of several stakeholders (viz., health, nutrition, and nongovernmental organization) and a great deal of support from family members. Those who required help for a bath were fewer than one out of ten in this study. A similar pattern was reported in a study from northwestern India.^[18] In contrast, a higher dependency for baths has been reported in several studies.^[7,10,12] Half of our study subjects had functional disability. In contrast, several studies have reported less prevalence of functional disability^[7,10,19] though higher dependence in ADL was observed in a study done in urban Bengaluru in South India.^[13] Dependence on account of ADL restriction was reported in studies conducted in rural settings as well. Considerable restrictions were reported in studies conducted in a rural area of Pune district of western India (seven out of ten)^[20] and rural Haryana in North India (nearly four out of ten).^[21] The prevalence of functional disability was lower compared to the studies conducted in Brazil^[14] (four out of ten) and Nigeria (one out of ten).^[22] In comparison to this study, a study in Brazil showed a considerable 11% less disability in Brazilian women.^[23]

This study further explored the domains of the restriction of ADL for self-care and mobility separately. The proportion of subjects with ADL dependency was considerably higher for mobility. This differentiation had not been discussed in other

studies mentioned above. This study found the functional status of subjects categorized according to the scoring of the Barthel Index was consistent with the functional status on the basis of Barthel Index.

Limitation

This study is primarily descriptive in nature and was confined to gender differences with regard to ADL.

Conclusion

The prevalence of functional disability on the basis of restricted ADL, particularly diminished mobility, in elderly subjects is high. The restriction for climbing stairs was more than it was for transfer. Restricted mobility needs the attention of health providers, family members, and all those involved in geriatric care. This study demonstrates the application of scoring to categorize elderly subjects according to their functional status.

Recommendations

Since half of the elderly subjects had functional disabilities, it will be worthwhile to initiate a primary prevention strategy to improve ADL performance together with secondary and tertiary health care. Categorization of subjects on the basis of Barthel Index to pinpoint the correlates of functional disabilities will be of immense value in prioritizing multisectoral activities to improve the performance of ADL for a better quality of life.

Acknowledgment

The authors acknowledge the sincere cooperation of participants of the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. United Nations Populations Fund (UNFPA) and Help Age International. Ageing in the Twenty-First Century a Celebration and a Challenge Executive Summary. New York: UNFPA and London, Help Age International; 2012. p. 3-4.
2. WHO; Falls Fact Sheet No. 344; 2012. Available from: http://www.who.int/ageing/active_ageing/en/index.html. [Last accessed on 2016 May 02].
3. WHO; Global Age-Friendly Primary Health Care (PHC) Centers Toolkit. Available from: http://www.who.int/ageing/active_ageing/en/index.html. [Last accessed on 2016 May 02].
4. Visaria P. Demographic of ageing in India. *Econ Polit Wkly* 2001;36:1967-75.
5. Population and Ageing and Development. United Nations Population Division; 2012. Available from: http://www.un.org/en/development/deas/population/publications/pdf/ageing/2012PopAgeingandDev_WallChart.pdf. [Last accessed on 2016 May 02].
6. Chandramauli C. Registrar General and Census Commissioner of India. Census of India 2011, Government of India. New Delhi; 2011.
7. Sharma S, Thakur M, Kaur S. Assessment of functional status in the performance of activities of daily living amongst elderly in sub urban population of India. *Int J Nurs Educ* 2012;4:94-6.
8. Irudaya Rajan S, Mishra US. Defining old age: An Indian assessment. *J UN Inst Aging* 1995;5:31-5.
9. Mahajan A, Ray R. The Indian elder: Factors affecting geriatric care in India. *Glob J Med Public Health* 2013;2:1-5.
10. Srivastava MR, Srivastava JP, Gupta P, Sachan B, Bhardwaj P, Choudhary S. Activities of daily living score and socio demographic profile among elderly in rural and urban areas of Lucknow city. *Int J Adv Res* 2014;2:437-82.
11. Shrama D, Parashar A, Mazta SR. Functional status and its prediction among elderly population in hilly state of North India. *Int J Health Allied Sci* 2014;3:159-63.
12. Sekhon H, Minhas S. A study of activities of daily living of elderly in an urban community of north. *Sch J Appl Med Sci* 2014;2:1450-4.
13. Srinivasan K, Vaz M, Thomas T. Prevalence of health related disability among community dwelling urban elderly from middle socioeconomic strata in Bengaluru, India. *Indian J Med Res* 2010;131:515-21.
14. Fillenbaum GG, Blay SL, Andreoli SB, Gastal FL. Prevalence and correlates of functional status in an older community – Representative sample in Brazil. *J Aging Health* 2010;22:362-83.
15. The Original Barthel Index of ADLs. Available from: <http://www.physical-therapy.advanceweb.com/Article/Theoriginal-Barthel-Index-of-ADL.aspx>. [Last accessed on 2016 Apr 24].
16. Shah S, Vanclay F, Cooper B. Improving the sensitivity of the barthel index for stroke rehabilitation. *J Clin Epidemiology* 1989;42:703-9.
17. Mathur A. Functional assessment, vital for elders. *J Indian Acad Geriatr* 2006;2:91-2.
18. Ohri P, Gupta SK, Upadhyai N. A study of daily living status among elderly in an Urban Slum area of Dehradun. *Indian J Community Health* 2014;26:417-22.
19. Medhi GK, Hazarika NC, Borah PK, Mahanta J. Health problems and disability of elderly individuals in two population groups from same geographical location. *J Assoc Physicians India* 2006;54:539-44.
20. Sinalkar DR, Kunwar R, Kunte R, Balte M. Across sectional study of gender differentials in disability assessed on World Health Organization Disability Assessment Schedule 2.0 among rural elderly of Maharashtra. *Med J Dr DY Patil Univ* 2015;8:594-8.
21. Gupta P, Mani K, Rai SK, Nongkynrih B, Gupta SK. Functional disability among elderly persons in a rural area of Haryana. *Indian J Public Health* 2014;58:11-6.
22. Gureje O, Ogunniyi A, Kola L, Afolabi E. Functional disability in elderly Nigerians: Results from the Ibadan Study of Aging. *J Am Geriatr Soc* 2006;54:1784-9.
23. Parahyba MI, Veras R, Melzer D. Disability among elderly women in Brazil. *Rev Saude Publica* 2005;39:383-90.